

ABSTRACT OF THE DISCLOSURE

RICE *MLH1* ORTHOLOG AND USES THEREOF

5 Compositions and methods for inhibiting the cellular mismatch repair system in a
plant host cell are provided. Compositions include the cDNA and amino acid sequence
of a rice *MLH1* ortholog. The nucleic acid molecules and proteins of the invention find
use in increasing the efficiency of targeted gene mutation and homologous recombination
in plants via inhibition of the plant cellular mismatch repair system. The plant cellular
10 mismatch repair system is inhibited through the use of transposon tagging of a *MLH1*
gene, sense- and antisense-suppression of a *MLH1* gene, antibody binding to a MLH1
polypeptide or variant polypeptide, targeted mutagenesis of specific amino acid residues
of a plant *MLH1* gene, and competition with a mismatch repair impaired MLH1
polypeptide through transgeneic over-expression of the impaired polypeptide. Also
15 provided are transformed plant cells, plant tissues, plants, and seeds. Additional methods
that are provided include the detection of as little as one base pair mismatch in a DNA
duplex and the generation of plants with reversible male sterility for applications in
hybrid generation.